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THE BEEF CALF:

its growth and development



Farmers' Bulletin No. 1135
U. S. DEPARTMENT OF AGRICULTURE

CATTLE HUSBANDRY is one of the oldest of vocations. In ancient times the word "cattle" represented money or wealth. Until comparatively recent times nearly everyone had at least an elementary knowledge of cattle husbandry, for cattle were used for draft, for milk, and for beef. But today a cow displayed in zoological parks in some of our larger cities may attract as much attention as creatures from distant lands.

Those who have continued to wrest a livelihood from the soil with the aid of cattle, however, are for the most part aware of the progress made in cattle improvement in the last century. This progress, particularly in the United States, has resulted in breeds that excel in the conversion of coarse forages and concentrates into marketable beef.

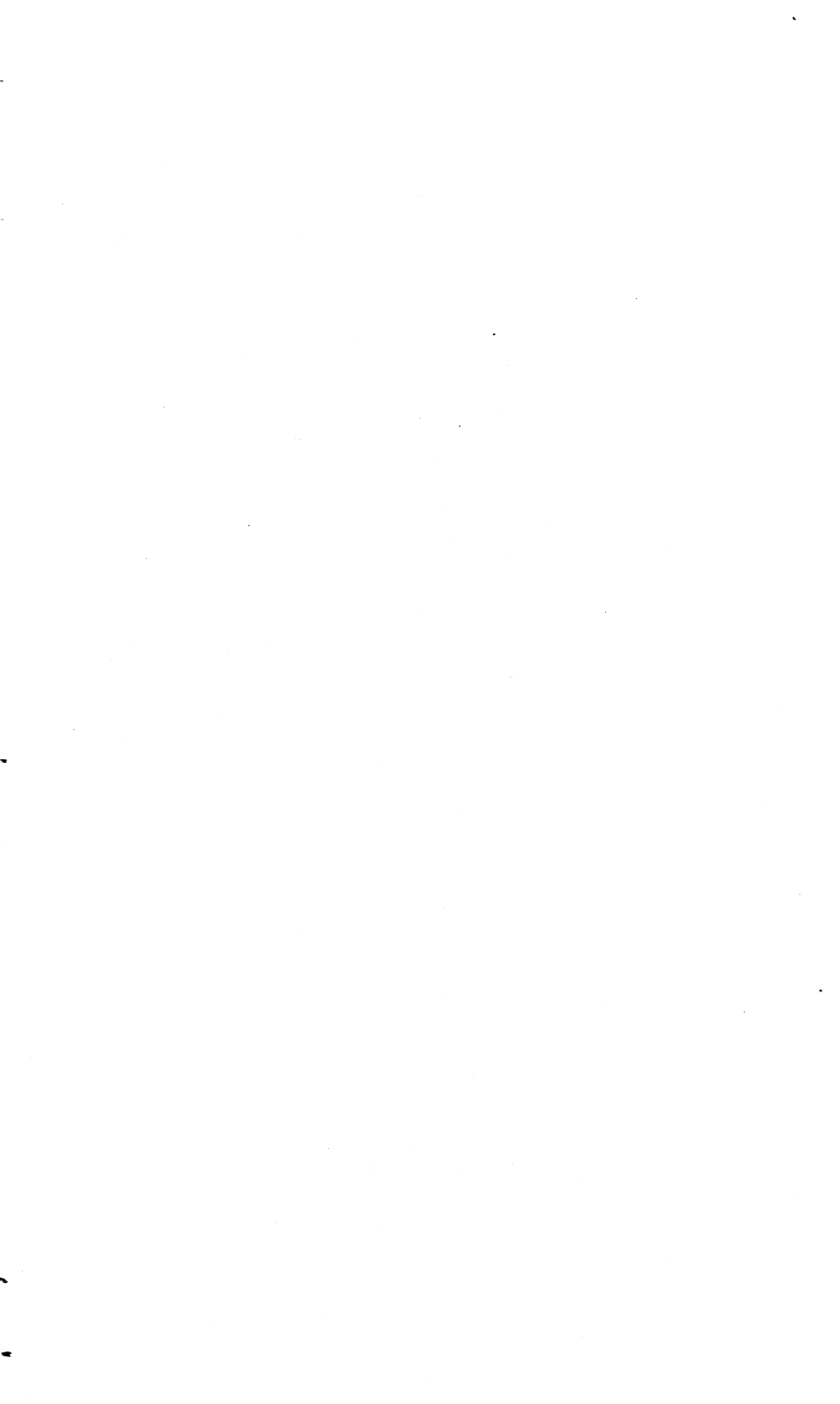
For those who desire to raise beef cattle and plan to start with one or more calves, the information in this bulletin should be helpful.

Washington, D. C.

Issued August 1920
Revised August 1950

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THE BEEF CALF: ITS GROWTH AND DEVELOPMENT¹

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WHEN TO SELECT A CALF

The best time to select a calf is at a few months of age, when it may be seen with its mother, and preferably before it is weaned. This applies both to the calf being selected for a show animal and to the one being kept in the breeding herd. If the calf's mother is a wide, deep-bodied cow with plenty of size and is giving a liberal supply of milk, you may be reasonably sure that the calf, if sired by a good bull and properly cared for, will grow into a useful animal. Another advantage of selecting the calf at this time is that it may be taught to eat grain before it is weaned. As it is sometimes difficult to obtain a calf at this age, it may be necessary to select one at weaning time or even after it is weaned.

Calves are frequently classified at fairs and calf shows as "senior" and "junior" calves, depending upon the time of year they were dropped. A calf, for instance, that was dropped between September 1 and December 31 the year previous to the show would be classed as a "senior" calf, and one dropped after January 1 of the year of the show, as a "junior" calf. As a rule, a fall or senior calf, on account of its age at the usual time of holding the show, is to be preferred, although there are advantages in selecting a spring or junior calf, especially one dropped in January or not later than February. This, however, depends upon the rules of the contest at which the calf is to be shown and upon the facilities at hand for feeding and caring for it.

THE KIND OF CALF TO CHOOSE

Choose a calf of the breed that you admire most and believe suited to your conditions. It will be helpful to select one of the breeds well represented in the herds of the successful beef cattleman in your county. You should cooperate with your neighbors in developing one breed for your community. You may obtain much valuable information about calves by working and talking with others, especially those who have had considerable experience. In building up your

¹ This is a revision of former editions by E. W. Sheets and W. H. Black.

² Deceased.

future breeding herd, select calves that are good individuals as well as purebred. They should be registered as shown by registration certificate issued by the national association representing the breed.

In addition to being a good individual, a calf should have a good pedigree. To know a good pedigree when you see it will require study of lines of breeding that have been successful. Read a history of your chosen breed. Become familiar with individuals and blood lines which have been instrumental in building up the breed. Such information may be obtained from books, from livestock journals, or from bulletins issued by your State college of agriculture or by the United States Department of Agriculture. Much valuable information may be obtained also from the secretary of the registry association of the breed you select.

Subscribe for a good livestock magazine. The official journal recognized by the registry association of the breed chosen is especially appropriate. Study the advertising section. Much can be learned from announcements of sales and auctions in regard to popular pedigrees. Examine carefully the pictures of the breed's best specimens. Become familiar with the names of the breed's noted individuals, both past and present, and look for them in a pedigree.

Attend public sales held by breeders. Study sale catalogs and note the remarks made with reference to the breeding of different animals. An appreciation of the esteem in which the breeders hold bloodlines of different individuals may be gained by noting the prices paid and the activity of the bidding on them.

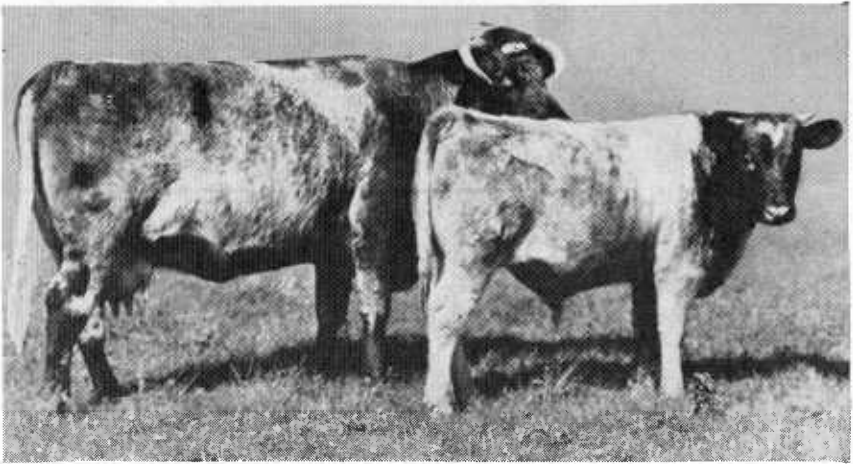
A word of caution here, however, may be necessary. Breeders frequently become over-enthusiastic on family bloodlines regardless of how distant they may be. Do not be misled by family names derived from a female as far back as the fifteenth generation. Such a pedigree would carry less than one-tenth of 1 percent of the bloodlines of the foundation cow, but the animal still would be known as a member of that family. In analyzing a pedigree consider carefully the parents in the first three generations, for they contribute seven-eighths of the heredity. Sire and dam contribute equally to the progeny. Look for the names of individuals in the first three generations that have proved to be good breeding animals. Some of these may come from small herds. Remember that a herd becomes famous by having produced outstanding individuals. The following is a sample pedigree showing the first three generations:

Pedigree of— Name, Idolmere. No. 199904, volume 25, page 14. Breed, Aberdeen- Angus. Sex, male. Color, black. Date of birth, January 8, 1915. Breeder (name). Address.	{ Sire, Oakville Quiet Lad, 109220 Dam, Home View Lady Idessa 2d, 86247.	{ Sire, Black Wood- lawn, 42088. Dam, Queen McHenry 62884 { Sire, Pabno, 38977. Dam, Lady Ideal 7th, 20498.	{ Sire, Bell's Eclipse, 20695. Dam, Blackbird 13th, 24464. { Sire, Heather Black- bird, 20333. Dam, Queen McHenry 5th, 17490. { Sire, Baltimore of Glendale, 24275. Dam, Pride McHenry 6th, 23936. { Sire, Black Aristo- crat, 11582. Dam, Anderson Findlay Lady Ideal 3, 12330.

SELECTING THE CALF

If the calf selected is to develop into a desirable animal for breeding purposes, it must be a good calf individually as well as the descendant of good ancestors (fig. 1). To be classed as a good calf it must have the proper form as well as the breed characteristics. If you expect to select a calf with these necessary requirements, you should become familiar with them. Study pictures of famous animals; note their form. A score card of the breed you are most interested in would be useful. Learn the different parts of a beef animal and the method of examination in judging them.

In selecting the calf, first get an idea of its general appearance. This you may do by looking at it from a distance of from 10 to 15 feet, observing its weight or growth according to age, conformation, quality, condition, body, breed type, and general disposition (figs. 2, 3, and 4). Observe it carefully, beginning at the head and neck, then forequarters, body, and hind quarters, in order named. Keep in mind

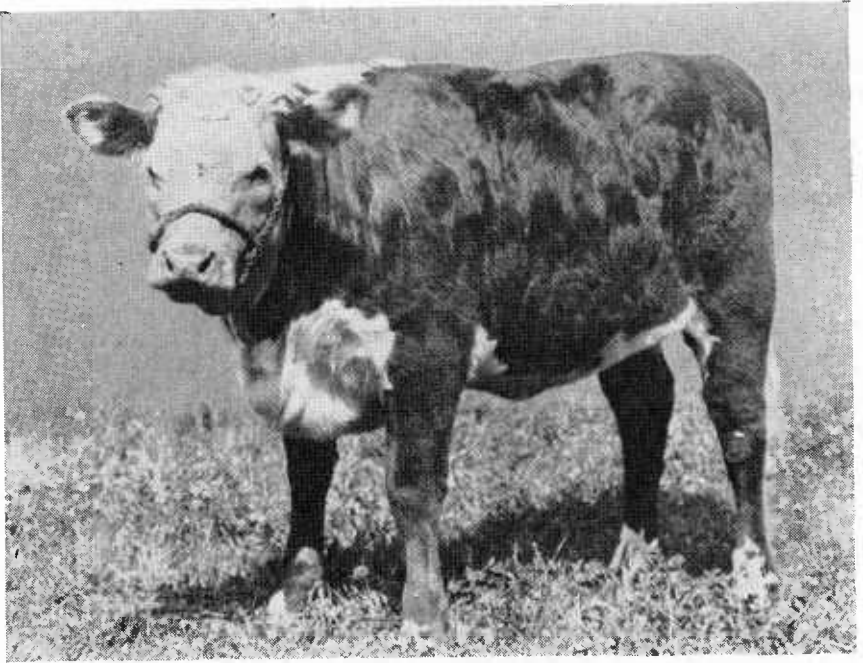


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FIGURE 1.—Select the calf if possible when it may be seen with its mother.

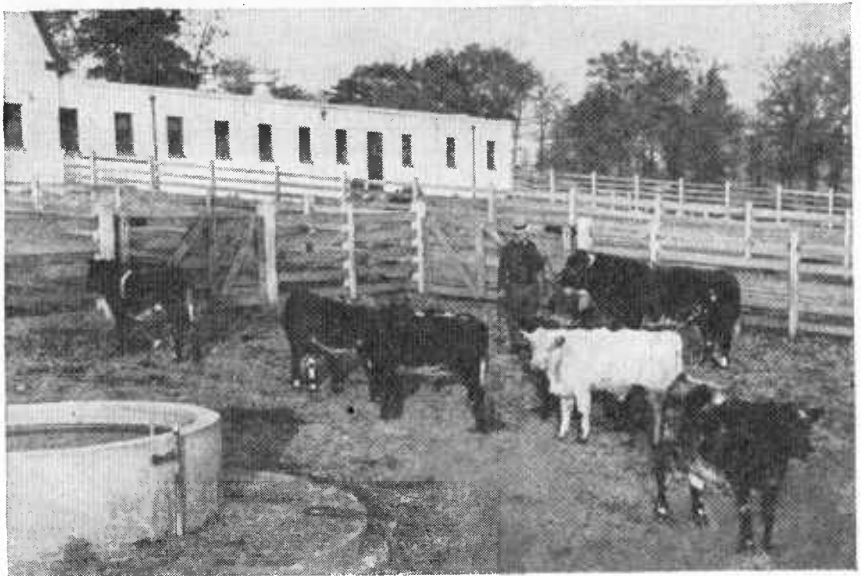
that you are selecting a calf for a definite purpose. If a bull is selected, it should not have the appearance of a heifer or a steer, but the strong, robust, masculine appearance of a bull in every detail. If a heifer is selected, it should have the feminine appearance of a good breeding cow and show refinement rather than the possible coarseness or roughness of a steer. A steer should be sturdy, thrifty, and well-proportioned, but less masculine than a bull.

Thus observing calves without putting your hands on them, select one that is stylish and active. When viewed from the front it should have a short face, large muzzle, wide forehead, short neck, and a wide, deep chest, indicating a strong, vigorous constitution. When looked at from the side its back should be straight and level from top of shoulders to tail. It should have a deep body and smooth, long hind quarters. When viewed from the rear it should present a wide, deep appearance. While as much width as possible is desired, it should not be accompanied with roughness about the shoulders and the hips



10938-C

FIGURE 2.—A calf of desirable type. Note beef conformation and excellent breed characteristics shown in this heifer.



10243-A

FIGURE 3.—Selecting calves for breeding purposes by observing them with their sire. See whether the offspring show uniformity.



24064-B

FIGURE 4.—Calves may be examined on pasture.

or hocks. The legs should be rather short, stout, and set wide apart. A calf that stands high from the ground, is cut up in the flank, shallow in the heart girth, and appears dull and listless, has little chance of developing into a profitable animal.

After you have found a calf with good general appearance, have some one hold it so that you can put your hands on it. This is the best way to determine "condition" and "quality." Condition means the amount of flesh and fat the calf has. Select a calf in good growing condition but not excessively fat. The beef calf should have great depth of natural flesh and be free from roughness or coarseness in any way. By running the open hand along the back and sides with a slight pressure of the finger tips the amount and quality of condition may be determined. A calf in proper growing condition, while not possessing the depth of flesh of a mature animal, should have a smooth, even covering of firm though not hard flesh along its back and sides and over the shoulders.

The following indicate quality: A thick coat of hair that feels soft and silky and looks glossy; a loose, pliable skin that does not seem thick, rough, or tightly stretched over the body; and rather short legs that appear to have strong, clean bones without roughness or coarseness.

A calf showing early maturity, as indicated by the tendency to put on an even covering of rather firm flesh, is desirable, and should be selected if possible.

The color of a calf is of little importance so long as it is an approved color for the breed desired. There are popular shades and color markings of the different breeds, which you will learn from further study of the breed selected.

EQUIPMENT NEEDED FOR RAISING THE CALF

The necessary equipment to feed and care for the calf properly should be provided. This equipment need not be expensive, but it should be convenient. The barn or shed should be cool in summer and dry in winter. An especially warm barn is not necessary, but cold winds and rain must be kept out.

The fences around the pasture where the calf grazes should be kept in good repair. Do not teach the calf to jump or be a rogue by allowing it to run at large or to go through or over poor fences. It is better to have a gate for it to walk through than bars to jump over.

The calf may graze with other cattle on pasture, but should be fed grain separately. A bull calf should be separated from the heifers at about 3 or 4 months of age. He should be kept with other bull calves or older cattle for company except at feeding time. The calf should then have a separate stall or pen. The stall or pen should be so arranged that the calf may see other calves or cattle to keep it from fretting when alone.

The stall should be kept clean and dry at all times. If the ground in or about the stall is low and wet, broken stone should be used to raise it. Small stones or gravel or preferably clay should be put on top and firmly packed down. Use plenty of straw, leaves, shavings, or other litter for bedding, so that the calf may be induced to lie down a large part of the time. A calf will not thrive and do well if made to sleep on a damp, foul-smelling bed. If the lot where the calf takes its exercise in winter is wet and muddy, the water should be drained off through ditches or otherwise.

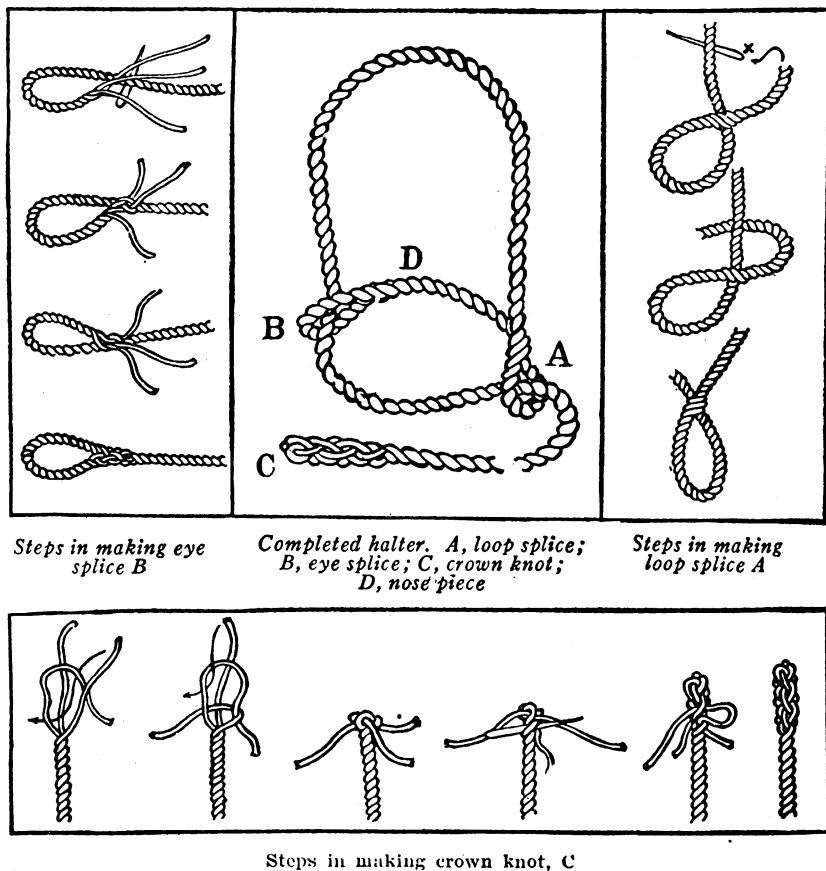
The feed manger for the hay and silage should be convenient and large enough to hold all the feed given, so that it will not be crowded out and wasted. The manger should have a tight bottom to hold the small particles of hay, especially the leaves, as they are the most valuable part. The feed box for grain should have a tight bottom and be large enough to prevent loss while the calf is eating. If some of the feed is lost, the cost of gains in weight will be greatly increased. The appearance of the calf usually reflects any negligence of the owner.

If the calf is watered from a trough or a stream, the place should be kept clean. Do not allow mud to accumulate about the approach to it. The overflow from the trough should be drained to one side. Broken stone may be used about the trough or the entrance to the stream to keep the ground from getting muddy. If a pond or a spring is used, do not allow the calf to stand in it, as that will dirty the water. Diseases of the feet may also be contracted from dirty watering places. If the calf is watered from a well or a spring by a bucket, provide one especially for that purpose.

A bin or box for storing grain should be provided. It should hold the grain supply for several weeks as mixed and weighed up. Keep the box in a dry, convenient place. It should have a hinged lid that will close tight to keep out chickens, rats, and other animals. Place a small box of salt in a convenient place to keep salt before the calf at all times.

A fork will be needed to keep the stall clean and to handle hay or other roughages. A large basket will be convenient to use in weighing and feeding silage.

Other items of equipment needed in caring for the calf are curry-comb, brush, coarse-tooth comb, burlap blanket, halter, and clippers or shears for trimming hair. A very strong, cheap, and serviceable halter, one which every boy should be able to make, is shown in figure 5.



67910-B

FIGURE 5.—A completed rope halter, and steps showing method of making. A marlinspike (a small pointed piece of iron or hardwood) is used to separate the strands. Make the loop splice first, because a completed eye splice will not go through the rope readily. The loop splice should be far enough from the eye splice to form the nose piece. Then make the eye splice, which should be just large enough to allow the rope to pass freely through it. A more detailed description will be given on application.

To make the halter use from 12 to 14 feet of $\frac{5}{8}$ -inch manila rope; sharpen a hardwood stick, called a "marlinspike," as illustrated, to separate the strands. The different steps in making the halter are shown in the figure.

HALTER-BREAKING THE CALF

A calf that is to be entered in a show should become accustomed to a halter before it is weaned, and the sooner the better. Place a halter on the calf, and tie it to a well-set post or immovable rail. Let it stand for an hour or so each day before attempting to lead it. Do this in the cooler part of the day so as not to cause the calf to become overheated. A light brushing may be given at this time, to help make the calf gentle, but do not brush its head until it has become accustomed to the grooming.

In teaching a calf to follow quietly when you lead it, do not shout at it or strike it. Grasp the halter rope with the right hand about 18 inches from the halter, hold the remainder with the left hand, and walk at a steady pace.

When the calf has become accustomed to being led, the next step is to teach it to stand quietly with its head up in a normal position and with its body weight evenly distributed on all four legs. A light pressure with the tip of a cane or a slender staff will aid in getting the calf to move a hind foot as needed to improve its position. If the calf is kept in a barn or small enclosure, it should be led around for half an hour or so every day.

KEEPING THE CALF HEALTHY

Most calf ailments are due to improper feeding, unsanitary conditions, or both. Keep the calf out of cold rains in winter as much as possible, and provide a dry, well-bedded stall at night. Provide nature's tonics—exercise, sunshine, pure air, abundance of fresh water, and a variety of feeds, and there will be little need for medical attention (fig. 6). These suggestions are offered to help prevent diseases rather than to cure them. Observe the calf closely at all



FIGURE 6.—A group of healthy calves in the feed lot.

41670-B

times. If it should appear drowsy, feverish, stiff, or sluggish, act quickly. Reduce feed at once and the disorder may be in a large measure prevented. Salt and an abundant supply of fresh water should be available always. Some of the commoner ailments only are briefly discussed here, with a few suggestions for first-aid treatment. In case of serious illness consult a competent veterinarian at once.

Constipation.—Occasionally when the newborn calf fails to get the colostrum, or first milk, from the cow its bowels remain inactive, and the first droppings are retained, which causes constipation. An enema or injection into the rectum of one quart of warm water in which one teaspoonful of common baking soda or one-half teaspoonful of common salt has been dissolved will usually give relief. Use a syringe or allow the solution to gravitate through a small rubber hose. Two tablespoonfuls of castor oil may be given, and repeated if necessary.

The droppings of an older calf should be observed daily. If they appear extremely solid, the animal is constipated or feverish. With older calves this condition may be relieved in most cases by promptly providing plenty of water, by reducing the grain and dry roughage and substituting a more laxative ration. A small quantity of linseed meal, wheat bran, and legume hay, such as alfalfa, soybean, or lespedeza, may be used. If this does not relieve the condition, give castor oil or raw linseed oil, one-fourth pint, or Epsom salt in doses according to the age of the calf, although dosing should be avoided as much as possible.

Diarrhea or "scours."—If constipation is not relieved diarrhea or scours may follow. This ailment is indicated by thin, washy, offensive droppings. It is usually the result of improper feeding, irregular suckling, or overfeeding with anything that overloads the stomach. Damaged grain fed to the calf, or even to the cow before the calf is weaned, may cause digestive disorders. Exposure or overheating may also be a predisposing cause.

Silage, alfalfa hay, and possibly linseed meal, when fed in large quantities to older calves for a long period, may cause this condition, which should be corrected by an immediate reduction of such feeds and the substitution of dry grass hays and a little cottonseed meal for a part of the ration. If such conditions occur with a calf not yet weaned, reduce the milk allowance and withhold all grain. In severe cases withhold all feed for 12 hours. As a last resort put the cow on dry feed entirely and let the calf suck another cow.

Remedies easily obtained for the small calf are castor oil, one tablespoonful to one-fourth pint, depending upon the size of the calf, given as a drench with warm, sweet milk, followed by one teaspoonful of a mixture of one part salol and two parts subnitrate of bismuth. Another remedy used with success consists of four drops of formalin to 1 quart of warm milk. Commonly used home remedies include whites of two raw eggs or a weak solution of limewater given in 1 or 2 tablespoonful doses. Feed and manage the calf so as to prevent diarrhea or scours. Such disorders stop the growth of the calf for several days at least and make it more susceptible to them later.

Blackleg.—Blackleg is an infectious disease that is accompanied with external swelling, usually about the forelegs or shoulders, the flank or the rump. When stroked or handled, the affected skin emits

a crackling sound. The germ causing the disease is widely distributed throughout most sections of the country. Young cattle between 6 and 18 months of age are most likely to take the disease; however, it is not uncommon in calves under 6 months. Blackleg is controlled by vaccination. All animals should be vaccinated before they are 6 months old and again 6 months later. Information concerning the distribution of vaccine may be obtained from your State veterinarian. Further information will be found in Farmer's Bulletin 1355, Blackleg, issued by the United States Department of Agriculture.

Lice.—It is not a reflection on the owner for his calf to have lice on it, but allowing them to remain there is a serious reflection. They not only annoy the calf but lower its vitality to resist diseases and disorders, and prevent normal growth. The hair of a calf infested with lice is usually rough, stands on end, and lacks the glossy appearance of a coat of a healthy, well-fed calf. The calf may become infested with two kinds of lice—blue and red. The one sucks, the other bites the skin. If a calf becomes infested with lice they should be removed at once. This may be done by dipping early in the spring or fall. As the lice reproduce from eggs, a second dipping in each case, from 10 to 14 days after the first, is recommended.

Since only a few dipping vats are available in most sections, it will be necessary to wash or spray the calf thoroughly with some good coal-tar, tobacco, or oil-emulsion dip prepared for the purpose. Neither dipping nor washing small calves is advisable in cold wet weather.

Many of the cattle dip compounds will injure the skin of human beings. Proper care should always be exercised in storing, handling, mixing, and applying the compounds recommended in this publication.

Store insecticides where children, pets, and other animals cannot get to them. Store and use those mixed with oils or kerosene so that there will be no fire hazard. Do not spray them in the presence of flame or sparks.

Persons handling, mixing, or applying insecticides should take proper precautions to protect themselves against exposure to skin contact, or breathing sprays or dusts. Wash parts of the body with which sprays or dusts have come in contact. In case of spilling, wash clothing which has become saturated.

Apply insecticides in a manner to avoid accidental contamination of food and water for human beings or animals. Observe carefully suggested concentrations and rates of application. Mix materials thoroughly and agitate them continuously in the spray tools.

Dispose of unused sprays in a way to avoid hazards.

An effective spray mixture that can be applied with a hand-operated sprayer may be made by mixing $1\frac{1}{2}$ ounces of 50-percent wettable DDT powder in 1 gallon of water. This quantity is enough to spray one animal one time.

If the weather is bad and a medicated dust is preferred, from 6 to 8 ounces of a 10-percent DDT dust per calf may be applied with a duster, and hand-rubbed well into the hair. A second application should be given 2 or 3 weeks later.

Rotenone may be used instead of DDT, either in spray or in dust form. To make enough spray for one animal, mix $\frac{1}{4}$ ounce of ground cube or derris containing 5 percent rotenone in 1 gallon of water.

Spray the calf thoroughly with this quantity, making certain that the liquid reaches the skin. Repeat the process 2 weeks later. If rotenone is used as a dusting powder, a strength of 1 to 1½ percent is needed, and this dust should be applied again in 2 weeks.

Further measures against lice are described in Farmers' Bulletin 909, Cattle Lice and How to Eradicate Them. Moreover, recent information suggests that most, if not all, of the newer chlorinated insecticides, such as lindane, chlordane, methoxychlor, TDE, and others, are highly destructive to lice and may be employed safely on beef cattle. The proper formulations of these compounds, and the best methods of applying them, are described fully in the labels of commercial products. One thorough treatment with these newer insecticides will often effect complete eradication of lice. In any event, these materials should always be used sparingly and cautiously, and should not be applied to beef animals during the few weeks immediately preceding slaughter.

Mange.—Small mites which attack the skin and cause it to become thickened and covered with crusts and scabs greatly annoy the calf and cause it to rub or lick itself constantly with consequent loss of hair about the tail, neck, and shoulders. The mites multiply rapidly and spread from a diseased to a healthy calf when the animals run together or occupy the same stall.

The treatment is to dip or wash the calf the same as for lice, with a lime-and-sulphur, tobacco, or oil-emulsion dip. A mangy calf, like a lousy one, never makes satisfactory gains nor a creditable showing. The hair is usually rough and the skin thick and coarse, giving the calf an unthrifty appearance. Calves that are free from parasites should be sturdy and healthy.

FEEDS FOR THE CALF

The beef calf is able to use to advantage many coarse, cheap feeds produced on the farm. It is a mistake, however, to think that the most profitable breeding animal can be grown on pasture, stover, or hay alone, for such is not usually the case.

Feeds which the calf should have are divided into two groups. One is called "concentrates," the other "roughages." The concentrates include either whole or ground grains and their byproducts, such as corn, oats, barley, wheat, rye, grain sorghums, velvet beans, bran, cottonseed meal, cottonseed cake, peanut meal, and linseed meal. Roughages are of two kinds: Dry roughages, such as hay, stover, and straw; and succulent roughages, which include silage and root crops. Pasture grasses or plants such as blue grass, Bermuda, lespedeza, clover, alfalfa, and prairie grass are classed as succulent roughages, as is also winter pasture of oats, wheat, rye, soybeans, cowpeas, velvet beans, or other crops sown to mature at the time pasture is desired.

All feedstuffs used should be clean and free from mold, mustiness, or any condition that would make them unpalatable or possibly disturb the digestive system of the calf.

Special kinds of feeds or combinations of feeds are necessary for the proper growth and development of the calf. Some are best suited for the production of fat, some for the production of muscle, hair, and hide, while others should be used for the growth of the bones or framework of the body. Unless the calf owner has already learned from study and experience the use and value of different feeds, he should do so, at least in a general way, in order to be able to feed suc-

cessfully and cheaply. He should pay especial attention to the feeding of concentrates. A better idea of their use and value for different purposes may be formed by dividing them according to, first, their protein content, and, second, their carbohydrate and fat content. Most feeds contain protein, carbohydrates, and fats, but many are deficient in some one of these important compounds.

Protein is the part of the feed that makes lean meat, hair, and hide in the calf. Carbohydrates and fats, although different in character and value, are both used for the formation of fat, and for this reason are spoken of or classed together as carbohydrates. The concentrates that are high in carbohydrates and fats usually contain little protein. Minerals, used in the formation of bones, lean meat, and blood, are also essential parts of feeds. Sufficient amounts are usually present in most feeds, especially if legume hays and a variety of concentrates are fed.

In many instances legume hays, such as clover, alfalfa, and lespedeza, are used to supply a large part of the protein needed in the ration. Hays and roughages in general, both dry and succulent, should also be used in a ration, because they keep the animal's digestive system in good condition. In a general way, both concentrates and roughages are classified according to their protein and carbohydrate value, as follows:

Protein Feeds

Concentrates
Cottonseed meal or cake.
Linseed meal or cake.
Peanut meal or cake.
Soybean meal or cake.
Velvet beans.

Roughages
Alfalfa hay.
Clover hay.
Lespedeza.
Peanut hay.
Soybean forage.

Carbohydrate Feeds

Concentrates
Corn.
Oats.
Barley.
Grain sorghum.
Rye.
Wheat.

Roughages
Grass hays (timothy, brome grass, orchard grass, prairie, etc.).
Straws (wheat, oat, etc.).
Corn or sorghum stover or silage.
Roots and beet pulp.
Pasture grasses.

In making up a ration (feeds for 1 day) for the calf it is always advisable to use at least one kind of feed containing a large amount of protein and two or more containing carbohydrates, such as corn, oats, or barley. In this way, both of the important nutrients are provided. A ration which contains the proper quantity of both protein and carbohydrates is called "a balanced ration" and should always be fed when possible.

FEEDING THE CALF TO WEANING TIME

The feeding of the calf from birth until weaning is a simple matter if its mother gives milk enough to nourish it properly. The principal part of the calf's ration, therefore, is cheaply and safely provided by giving the mother the proper feeds for the production of milk. Do not feed the cow too heavily on grain soon after she has dropped the calf. While the calf should have plenty of milk at all times, it should never have too much, especially soon after birth.

A calf dropped in the fall or winter usually will do better if kept separated from its mother and allowed to suck night and morning.

In summer it should be provided with a lot for exercise and pasture in the daytime, and during the winter with a well-bedded box stall at night. When the calf is from 4 to 6 weeks old a good plan is to bring it from the lot early in the morning, allow it to suck, then take it to the pen or stall to be fed some grain. It should also be suckled at night before grain is fed, then taken out to the grass lot or fed a little hay in the stall. To keep a calf contented when away from its mother, allow it to run with other calves. A bull calf should be separated from the heifers at the age of 3 or 4 months. If the calf is dropped late in winter or spring, allow it to run with its dam for several months on pasture if this is convenient.

Although milk is the natural food for the calf, a little grain should always be provided in addition to milk. If both the cow and the calf have good pasture and the cow is giving milk enough, the calf will grow to weaning age in good condition with less grain than otherwise would be needed. Frequently, however, the amounts of both pasture and milk are somewhat limited and the feeding of more grain is essential for best results.

When from 4 to 6 weeks old a calf may be taught to eat grain. This is done by providing the calf with a creep or pen to which the cow does not have access. A good ration for the first few weeks is coarsely ground corn, oats, and wheat bran, equal parts by weight, with a small quantity of linseed meal added every few days. Feed the calf at first one-fourth pound of grain a day, or just what it will eat up clean, giving one-half of the amount night and morning. After a few weeks a ration of coarsely ground oats four parts, cracked corn two parts, and linseed meal one part by weight should be satisfactory up to weaning time.

The calf should be eating from 2 to 3 pounds of grain a day when 6 months old, or approximately $\frac{1}{2}$ to 1 pound of grain per 100 pounds of live weight. To make the most satisfactory growth the calf should have a liberal supply of milk for several months longer, especially if it is to make maximum growth and show to the best advantage at the fair. A calf should make a continuous growth from birth, if fed in the way described. If the animal is weaned properly, so that none of the calf fat or bloom is lost, the chances for it to grow out and become profitable and useful are decidedly in its favor.

The calf is old enough to wean when 8 to 10 months old. Begin the weaning by allowing it to suck only once a day for a week, then every other day for 4 or 5 times. Increase the interval until no milk at all is allowed.

FEEDING FROM WEANING TO MATURITY

The feed, care, and management the calf should receive after it is weaned depend largely on the time of year it is dropped. A spring calf should be fed differently from one dropped in the fall. In either case, however, the principal part of the calf's feed for the first few months is its mother's milk. In addition to milk the calf should be fed grain so that at weaning time it will be getting from 2 to 6 pounds, depending upon the age of the calf and time of year when weaned. It should also have a little silage and a liberal amount of hay as well, if good pasture is not available.

If the calf has not been taught to eat grain before it is weaned it should be taught at once. Begin by feeding it as recommended for

the calf before weaning. The amount of feed, however, may be increased more rapidly than with the unweaned calf. In a month or 6 weeks after it is weaned it should be eating from 4 to 6 pounds of grain with 10 pounds of silage and 2 to 3 pounds of clover hay, with a small amount of other roughages like stover or straw in addition, unless sufficient pasture is available.

A standard grain ration for the calf may be made of corn, oats, and bran, equal parts by weight, or corn five parts and oats or bran three parts by weight, with one part of linseed meal added to both unless the ration proves too laxative. In many cases all these feeds may not be available. It will be necessary then to substitute other feeds. The following substitutions are recommended:

Feed:	Substitutes
Corn-----	Barley, kafir, milo, oats, wheat, or other feeds high in carbohydrates and fats.
Oats-----	Bran, coarse middlings, other grains.
Bran-----	Ground oats, coarse middlings, gluten feed, beet pulp.
Cottonseed meal-----	Cottonseed cake, linseed meal, peanut meal, velvetbean feed, soybean meal, or other feeds high in protein.
Corn silage-----	Sorghum silage, other silage, roots or mangels.
Clover hay-----	Alfalfa, lespedeza, peanut vine, soybean or grass hays.
Corn stover-----	Oat straw, other straws or stovers.

The quantity of grain to feed should be determined at all times by the appetite of the calf. Feed what it will clean up in a short time and still act as though it could eat just a little more. A variety of hays should be provided if possible. While the beef calf can use cheap roughages to advantage, good hays, preferably green colored, leafy legumes, such as clover, alfalfa, and lespedeza, are more satisfactory. Well-cured, bright, corn stover or oat straw may be used to supply a part of the roughage needed and keep the calf's appetite good and its digestion in proper order. Give as much hay as it will consume, but do not allow any waste. If the calf is on good pasture it will not consume much hay. As it increases in age it can be fed silage to advantage. Avoid overfeeding with silage, as there is danger of digestive disturbances, especially when a liberal supply of milk is also available.

Pasture should be provided at all times. Next to milk it is nature's balanced ration. Sufficient pasture may be obtained from such pasture plants as blue grass, Bermuda, lespedeza, carpet grass, clover, alfalfa, and prairie grass. Late fall, winter, or early spring pasture may also be obtained by grazing such crops as rye, oats, wheat, soybeans, cowpeas, and velvet beans. Use great care in pasturing legumes, such as alfalfa and the clovers, also winter pasture crops. Turn the calf on such crops for only a short time at first, because the calf may bloat from overeating. After it becomes used to them it may graze with safety.

RULES OF FEEDING

There are many things to remember in feeding the calf. They may be called rules of feeding and should be carefully followed.

1. Provide a variety of feeds at all times, if possible. It is easier to supply the proper amounts of the desired nutrients which the calf needs, if several different feeds are used. The ration will also be more palatable.

2. Do not make sudden changes in the feeds used or in the amounts given. If it becomes necessary to make a change, for instance, from clover to alfalfa hay, feed part clover and part alfalfa for a few days. Gradually reduce the amount of clover and at the same time increase the alfalfa.

3. Do not overfeed the calf. Feed as much grain as it will clean up in 30 minutes. If any feed remains in the trough it should be removed and less given the next time. Digestive disorders occur from feeding too much rather than too little.

4. Do not underfeed the calf. It should make a continuous gain, growing some each day. It never pays to starve a calf. In fact, the calf does not begin to pay for its feed until it is given enough to make some gain.

5. Do not annoy or disturb the calf unnecessarily. The fattening or growing calf should be kept as quiet as possible.

6. Do not feed moldy, musty, or spoiled feeds. To do so may cause serious digestive disorders. All hays should be bright, well cured, and free from mustiness, dirt, and coarse weeds. The grain also should be free from dirt, mold, and mustiness. If ground feeds get wet they are likely to mold. They should not be fed if in bad condition.

7. Do not waste time in preparing feeds. To waste time in feeding or preparing feeds needlessly increases the cost of gains. After weaning, grain may be fed whole except when teaching the calf to eat and possibly also near the end of the fitting or finishing period. Whole grain as a rule is more palatable than finely ground feeds. Ear corn may be shelled, broken, or chopped up in the feed box. Husks on snapped corn need not be removed for this purpose. It rarely pays to shred stover or to cut or chaff hay for the calf. It need not be fed three times a day when twice a day will do as well, although the former may be practiced when fitting the animal for show or sale. Moreover, it does not pay to buy prepared "stock feeds" when the necessary feed items are available. Home-mixed feeds are usually cheaper and equally satisfactory if not more so.

Do not buy "remedies." A healthy calf does not need "condition" powders.

FEEDING THE STEER CALF FOR SHOW

Steer calves may be fed and handled up to 6 or 7 months of age in the same manner as calves of similar age that are to be developed into breeding animals. From that age on, however, a steer calf that is being fattened for show should be fed so as to acquire a greater degree of fatness, or "finish." To accomplish this, feed a larger proportion of fattening feeds, such as grain or other concentrates, and gradually decrease the amount of hay or other roughage. The steer calf from 6 months to 1 year of age may be fed a concentrate mixture made up according to one of the combinations listed below. Other similar feeds may be substituted as suggested elsewhere in this bulletin.

If the calf has been creep-fed from about 2 months of age, by the time it is 6 months old it should eat about 3 or 4 pounds of the fattening concentrate mixture daily, a little silage, not more than 4 or 5 pounds a day, and a little green-colored, leafy alfalfa hay. If silage is not available, a little more hay may be fed instead, or 1 or 2 pounds of beet pulp may be substituted for the silage. As the calf grows older

the amount of mixture fed may be slowly increased. If there is a tendency for the calf to get a little paunchy, the silage or other roughage may be reduced a little.

<i>Mixture No. 1</i>	<i>Parts by weight</i>	<i>Mixture No. 3</i>	<i>Parts by weight</i>
Coarsely ground corn-----	5	Coarsely ground barley-----	8
Coarsely ground oats-----	2	Coarsely ground oats-----	6
Wheat bran-----	2	Wheat bran-----	4
Linseed meal-----	1	Linseed meal-----	1
		Soybean meal-----	1
<i>Mixture No. 2</i>		<i>Mixture No. 4</i>	
Steam-rolled barley-----	6	Corn-and-cob meal-----	7
Coarsely ground oats-----	2	Wheat bran-----	2
Linseed meal-----	1	Peanut meal-----	1

It is a good plan to turn the calf out in a pasture at night after the evening feeding if a good bluegrass pasture or one of mixed-seeding is available. Exercise and green feed are very desirable, but if the calf does not eat a liberal quantity of grain, it may be necessary to stop the pasturing. In its stead a little cut green feed or sliced carrots may be fed as an appetizer or else a little molasses—one-quarter of a pint diluted with three times that amount of water—may be sprinkled over the concentrate mixture at feeding time. One or two pounds of beet pulp, slightly moistened with water, can be fed to add variety as the calf grows older.

Toward the end of the fattening period, about 3 or 4 weeks before the calf is to be shown, some showmen cook barley or wheat and feed it warm, as they believe this stimulates the calf's appetite, especially in the late fall or winter when the weather is usually cold.

PREPARING FOR SHOW OR SALE

When a well-fed and properly developed calf is brought into the show or sale ring it should present a pleasing appearance. To do this it should be clean, well groomed, halter broken, and trained. It should become accustomed to being handled by strangers, seeing strange sights, and hearing unusual sounds, such as it will see and hear at the show or sale. A good calf is frequently placed below an inferior one because the judge cannot put his hand on it to judge it correctly. The trained animal that stands correctly and "poses," has the advantage over one that flinches, kicks, pulls on the halter, and stands with its feet in such position as to give the appearance of a weak back, narrow chest, and poorly developed rump.

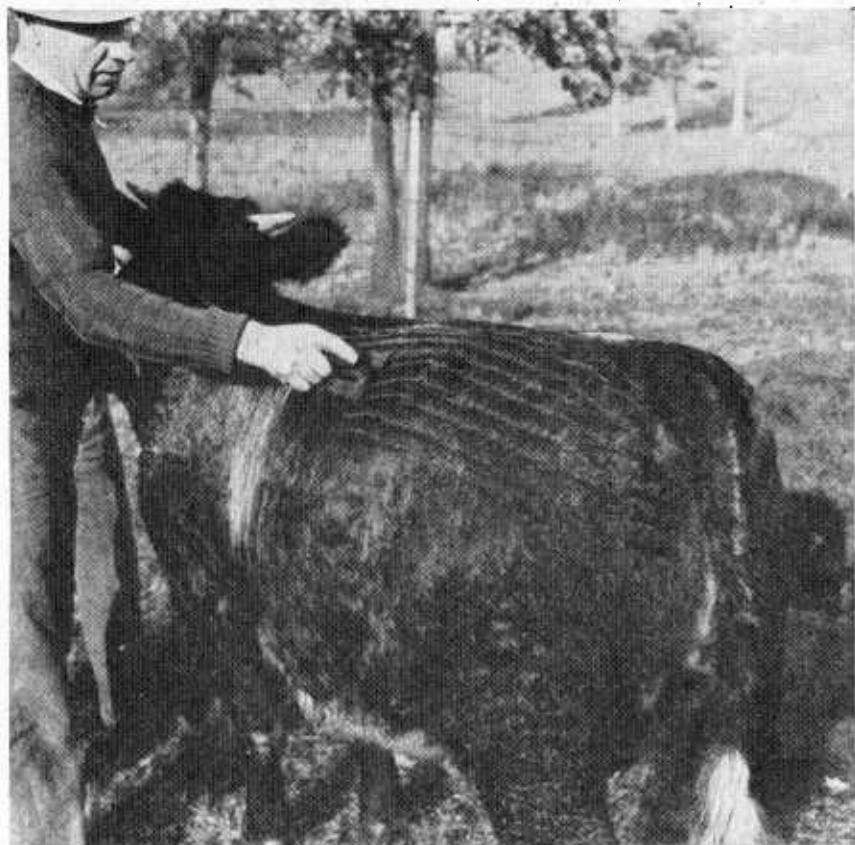
For a few months before the show it is desirable to feed three times a day. See the section on feeding for show.

The calf should be kept in a cool barn during the day and allowed to graze at night for a few months previous to the show. The hot sun from June to September will "sunburn" the hair and cause it to appear somewhat dead, rough, and coarse, and to lose its glossy appearance. Burlap bags suspended by wires from above, against which the calf may brush, will help it repel flies. The stable may be darkened and flies kept out by tacking burlap sacks over the windows and doors. The frequent use of a fly spray is desirable.

A few weeks before the show the calf may be blanketed to advantage. The blanket, usually made of burlap, is used mainly to keep flies from worrying the calf, to give the hair a more glossy appearance, and to help mellow or soften the hide. The blanket should extend from the neck to the tail and come down over the sides.

When the calf is taken from its stall before the judge at the show, it should be clean and carefully groomed. The use of sufficient bedding will help to keep it clean. Do not wait until time to bring your calf to the show or sale before cleaning it up. Begin at least a month before, and give it a good washing about once a week with warm water and tar soap. Make a good suds in the water and then add more soap to the hair. Rub and work the hair with the hand or brush until all dirt is worked loose. Wash the suds and dirt out with cold water. Frequent washing keeps the hair loose and fluffy.

The calf should be groomed or thoroughly brushed each day for several weeks before the show. Brushing lengthwise of the body with considerable pressure will help work the hide loose, make it pliable, and gradually remove the old hair. The final brushing on a short-haired calf should be in the same direction as the hair, the hand each time following the brush. The hand will draw the oil to the tip of the hair. A woolen cloth may be used to remove dust and dirt. The final brushing of the long-haired breeds (Shorthorn, Hereford, Galloway) should be in the direction opposite to the growth of the hair to make it loose and fluffy (figs. 7, 8, and 9). Short-haired animals are usually



10237-A

FIGURE 7.—The lining or marking comb, that produces a foundation for curling and gives the hair a fluffy appearance, is used extensively with Shorthorn cattle.

shown with the hair smooth (fig. 10), whereas animals with long hair are shown with the hair curled.

An hour or two before the long-haired calf is to be shown, moisten the hair with a mixture of creosote dip and soapy water. Do not make the hair too wet or it will appear in locks instead of loose and fluffy. The hair on the center of the back should be parted with a coarse comb along the backbone in one straight line from the neck in front of the shoulder to the tail. Comb the hair on each side at right angles or straight out from the center part to the extreme edge of the flat portion of the back. Mark the hair with the comb or brush from in front of the shoulders to the tail. The lines should be on the outer edge of the flat portion of the back so the end of the hair will curl up even with the level portion of the back and make the back appear wide.

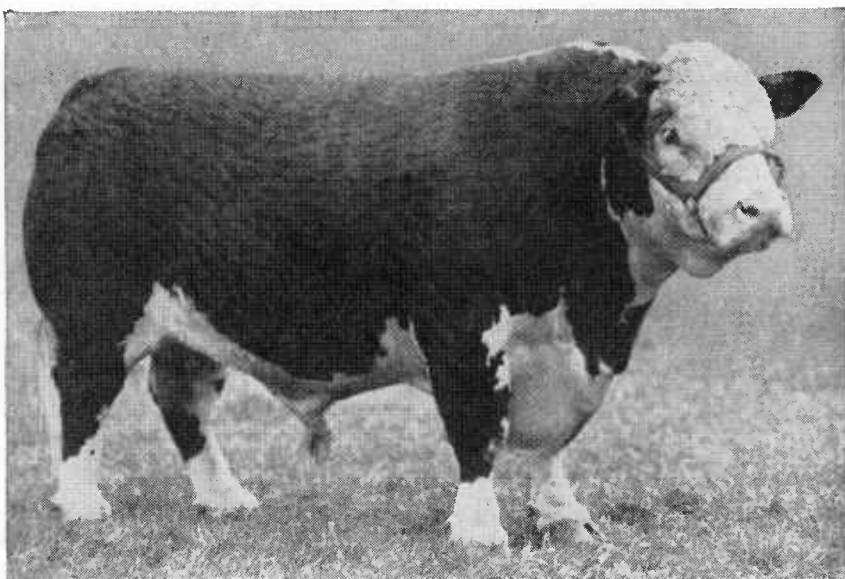


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FIGURE 8.—After the hair is marked or lined, the tips are brushed up to give a fluffy appearance.

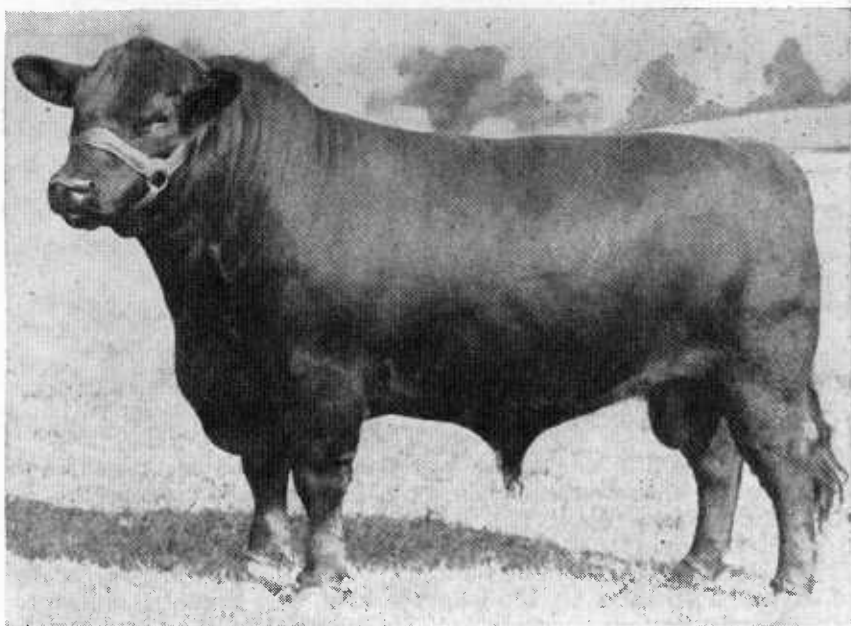
The lines should be about $1\frac{1}{4}$ inches apart, depending upon the size of the calf, and parallel to the first line. After considerable experience, the curling of the hair may be done with the currycomb alone. A round currycomb is best for this purpose. After all the lines are made, the hair that was combed back in making the marks should be lightly brushed up with a brush or currycomb. This will leave the hair in distinct wavy lines as desired. The hair on the flanks and defective places should be brushed up to fill them out.

If the hair does not have the desired shiny or glossy finish, dampen a cloth with a mixture of equal parts of olive oil and denatured alco-



81216-B

FIGURE 9.—The hair of the Hereford generally has a natural wave and when it is dampened it tends to curl readily.



68338-B

FIGURE 10.—The Aberdeen-Angus is usually shown with the hair smooth.

hol. Apply this lightly on the hair, following with the hand to give it a proper finish.

The tail of the Aberdeen-Angus is usually clipped all the way down to the switch. In order to obtain a wavy appearance of the switch

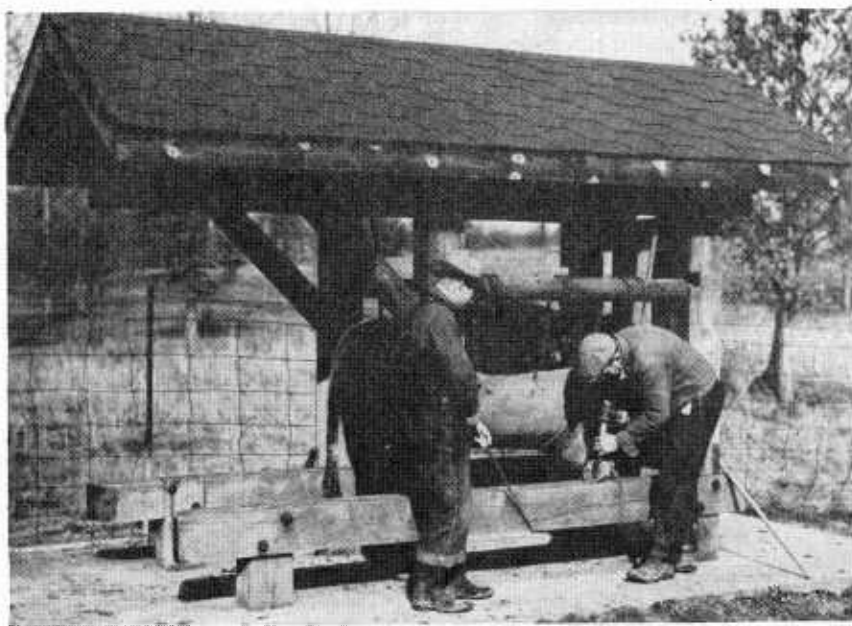


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FIGURE 11.—Aberdeen-Angus tails are usually clipped; the switch is brushed out to give a fluffy appearance, and the hair on rounds and flanks is sometimes brushed upward.

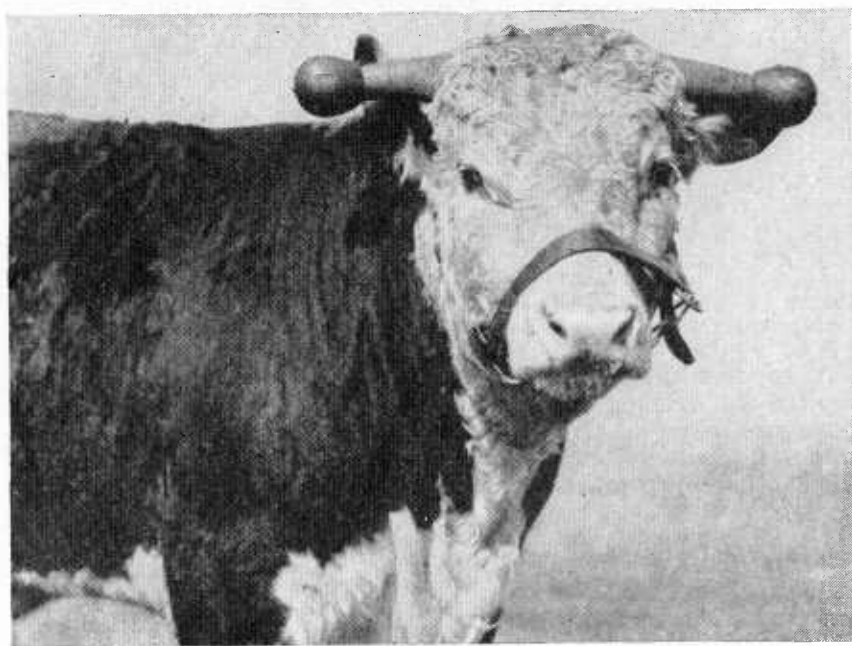
when the animal is shown, the hair is usually braided into three or four strands while wet and then combed out a short time before the animal is to be shown (fig. 11).

The feet should be kept clean, free from soreness, and in trim (fig. 12). A calf cannot stand or walk properly if the feet are sore or out of shape. If the toes are too long, the hoof must first be trimmed by tapering the bottom properly from back to front, thus leveling the hoof. This can be done with a chisel or hoof clippers. The hoof may be smoothed off with a file or rasp and polished with sandpaper or emery dust and oil. A mixture of oil and lampblack makes a suitable hoof polish. The feet of calves that stand in the stable, especially if not kept clean and well bedded and given frequent exercise, may become tender or even sore and diseased. The calf in such cases may



66711-B

FIGURE 12.—Trimming the hoof with a wood chisel and mallet is best done in cattle stocks. The growth around the edges of the under surface may be removed with hoof nippers.



21174-B

FIGURE 13.—Weights are used to train the horns.

limp, to its disadvantage. Sore or tender feet may be prevented by frequent exercise on the ground, clean quarters, and properly trimmed hoofs.

On the horned breeds a well-curved set of horns commands the admiration of the judges. The plain-headed animal of the horned breeds or one with poorly shaped horns will be at a disadvantage and probably discounted by the judge. A symmetrical, properly curved set of horns can be obtained by the use of either weights or trainers. The horns can be trained as soon as they are long enough and sufficiently strong to bear the proper weight. Care must be taken to see that weights are not put on while the horns are too young and soft. If the horns yield too quickly, remove the weights and give the horns a rest of from 10



10227-A

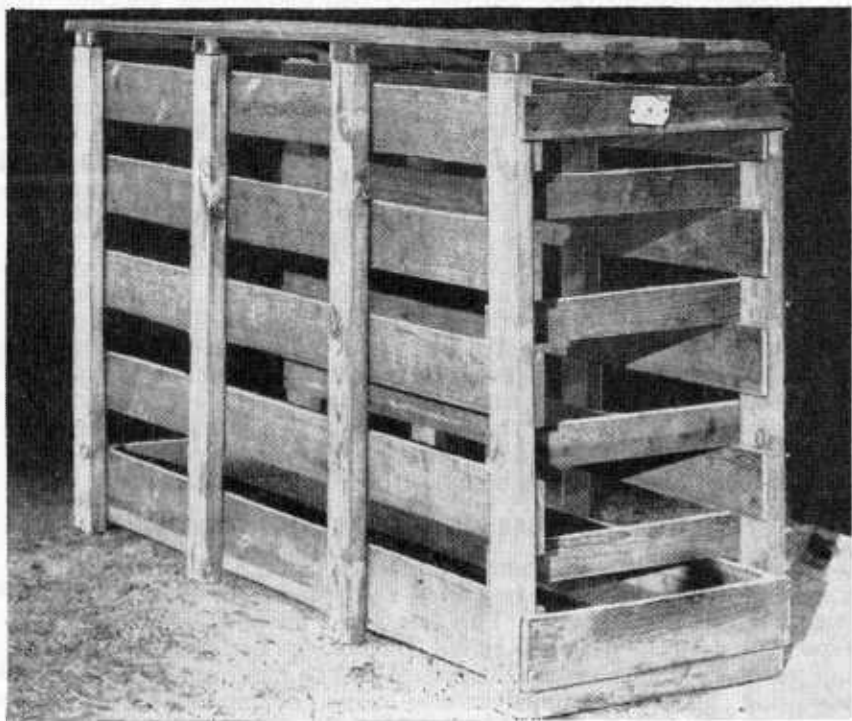
FIGURE 14.—Apply a rasp to remove the rough outer surface and to shape the horn properly. One horn has been rasped, scraped, sandpapered, and polished.

days to a month, depending upon the condition of the horns. Then replace the weights, until the desired effect is obtained. When the horn gets below the level of the top of the head the direction of the ultimate growth will usually be decided (fig. 13). Skill in horn training is acquired by practice. The size of the weight to use can be determined only by experience.

Horns of medium size, neatly polished, improve the appearance of the animal. The rough surface should be smoothed first with a sharp knife then with a rasp or file (fig. 14), finished with fine emery paper or emery dust, and polished with a woolen cloth moistened with linseed oil. A polish also frequently used is sweet oil and tripoli. Cottonseed or linseed oil may also be used for this purpose.

TAKING THE CALF TO THE SHOW

The calf should be taken to the show or sale a day or more before the date set for the event to begin. It should be taken on the train or hauled if the distance is more than a few miles. A fat calf not accustomed to walking on the road, seeing strange sights and hearing strange noises, may become greatly worried and fatigued from such a trip. Do not overheat the calf. Lead it quietly to the loading platform, if shipped by express or hauled in a truck, and use a specially built crate (fig. 15). If shipped in a crate or with other cattle in a box car, plenty of bedding should be provided. Feed the calf a little less just previous to and while on the trip, especially of grain and succulent roughages. When the calf gets to the fair ground or sale



10912-C

FIGURE 15.—A shipping crate should be of a size suitable for the animal and securely put together.

pavilion it will then be eager for feed. Do not feed grain immediately upon arrival, but give it plenty of water and some hay until it has rested an hour or more from the trip.

While at the show give the calf plenty of exercise; take it for a walk about the grounds in the early morning. Remember that if you are to be successful in the show or sale ring you must pay close attention to your calf. Be kind, attentive, and faithful and you will be more liberally rewarded.

The show ring is the best school you have ever attended, provided you take decisions against you as well as for you cheerfully and try to

find the reasons for them. There are usually good reasons, and they will help you greatly to be more successful at the next show or sale.

FOR MARKET OR FOR BREEDING

After a good calf has been properly grown and developed, the question "What shall I do with it?" may arise. In most cases the young owners would no doubt prefer to keep the calf. This should be done, however, only after very careful consideration. It is assumed that the calf has had a good home, that it has been welcome at all times by other members of the family, and was brought up on a farm where feed, pasture, and equipment for caring for it properly were always available. Would these be provided for the mature animal as they were for the calf? Above all, do you have the desire to become a breeder of purebred beef cattle? Do you get real pleasure in working with them and serving them? If you do, and if the home farm is well suited to the business, you are probably justified in keeping the calf for breeding purposes.

If the calf is a heifer, she of course has to be fed and cared for so as to grow into a useful cow—one good enough to be the foundation of your herd. It is important that she have been grown, developed, and fitted for show in a way that will not limit or impair her usefulness as a breeder, whether kept by the owner or sold. As so many calves are underfed and improperly cared for, it does not seem necessary to caution against overfeeding or fitting the calf; occasionally, however, the usefulness of a promising breeding animal is materially lessened by the treatment it receives previous to breeding age.

A bull calf of desirable breeding and individuality may also be retained for breeding purposes on the home farm, although there are many reasons why a heifer would be a better choice.

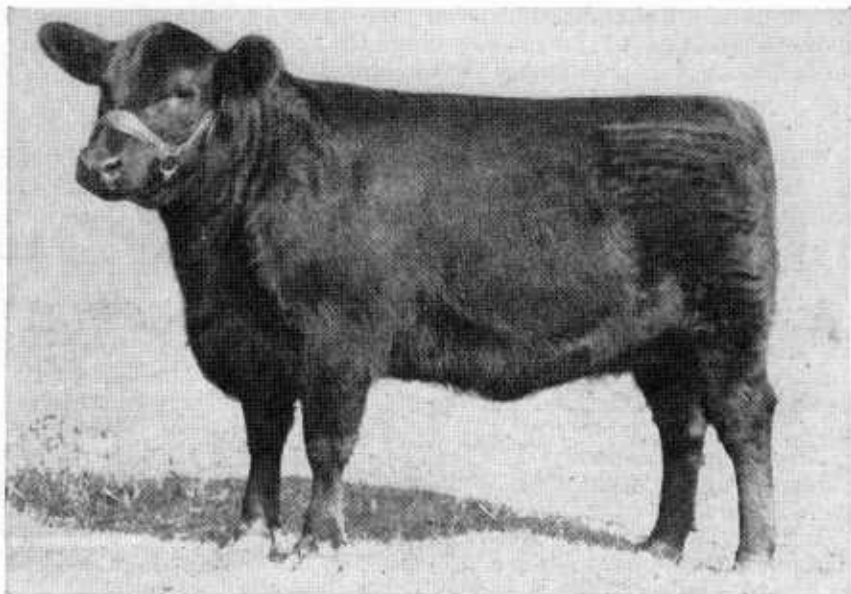
A few suggestions as to the feeding and care of older animals are given, but the reader should get other publications giving more of the details if he has decided to become a breeder of purebred beef cattle.

FEED AND CARE OF THE BREEDING HEIFER

It frequently happens that the purebred heifer is well cared for as a calf but when weaned is neglected and required to shift for herself with the rest of the herd. This is a great mistake. Although it is especially desirable that she be fed cheaply, the heifer kept for breeding purposes should grow all the time and be maintained in vigorous condition (fig. 16). As she increases in age, cheaper and bulkier feeds may be used, but they should be fed liberally. Inferior breeding animals are largely responsible for "scrubs," although the empty feed rack adds many more to the list. A daily feed of from 15 to 20 pounds of silage, 4 or 5 pounds of legume hay, with a little other dry roughage like stover straw or cheap hays, the amount depending upon the age of the heifer, will be satisfactory and economical. Silage is especially desirable. If it is not available, enough grain similar to that fed the older calf should be provided, with sufficient bright-green, leafy roughages to make satisfactory growth.

The heifer should be kept on pasture as much of the time as possible. If good pasture is available during the summer no supplemental feed will be needed until late in the fall.

The heifer may be bred when about 18 months old. The ration after that time should be sufficient for her own growth and for the develop-



68336-B

FIGURE 16.—A heifer that shows the effects of good care and sufficient feed to keep her growing rapidly.

ment of the fetus, or unborn calf. The mineral matter of the ration, especially lime and phosphorus found in the legumes, and common salt, are important for her at this time. A lack of these substances will result in a weak, small-boned calf, and the effort of the cow to supply them from her own body will weaken and stop her growth. Unless well fed and cared for, she will be unable to give sufficient milk to nourish the calf properly without an additional tax upon her own body.

Previous to calving time, the ration, especially the bulky part of it, should be reduced and made slightly laxative. Wheat bran, oats, and linseed meal are desirable for this purpose. If the animal is on pasture no special attention to the ration need be given. During the winter, legume hays should be provided if possible. Use little corn, cottonseed meal, or similar feeds previous to calving.

If the heifer has been properly fed and cared for up to calving time and has had plenty of exercise she will need no assistance and little, if any, attention. This is especially true in good weather if the cow is allowed to calve on pasture. It is important that she be not disturbed by other animals. Put her into a grass lot or small pasture, if possible, by herself, away from ponds, streams, or rough, steep hillsides. In winter a well-bedded box stall should be arranged. Do not tie the cow, but give her the freedom of the stall. It is best to keep out of sight as much as possible, observing her only occasionally, to be ready to give any help needed.

After the calf has been dropped allow the cow to care for it alone. Give the cow all the clean fresh water she will drink. The water should not be icy cold. See that the calf is soon able to stand and suck. It is important that the calf get the cow's first milk. If the calf has been dropped in a stall or barn lot, it is a good plan to apply tincture

of iodine or a 3-percent solution of pine oil or a coal-tar disinfectant to the exposed end of the navel cord and the skin and hair immediately surrounding it so as to reduce the likelihood of navel infection.

FEED AND CARE OF THE BULL CALF

The bull calf retained for breeding purposes, like the heifer, should not be allowed to shift for himself with the rest of the herd. He should be given a separate pasture in summer and a box stall with a lot for exercise in winter. Other bull calves or a bred cow or heifer should be put into the same lot for company. The box stall or shed should be near other cattle for the same reason.

The feeds for the bull calf should be similar to those for the heifer. He should be fed in sufficient quantities to keep him in a strong, vigorous condition at all times. The bull is considered one-half of the herd. If you starve and stunt the bull, the consequences to the herd may be serious.

The bull, if well grown and cared for, may be used in a limited way for breeding purposes when 18 months old. It would be better if he were 2 years old or more before being used very much.

It is important that the bull calf shall have been taught to lead and to stand tied before it is a year old (fig. 17). This will enable you to handle him more easily and with less danger to yourself. It will impress upon him the fact that you are his master, and he will soon learn to mind you as well as depend upon you for just and proper treatment.

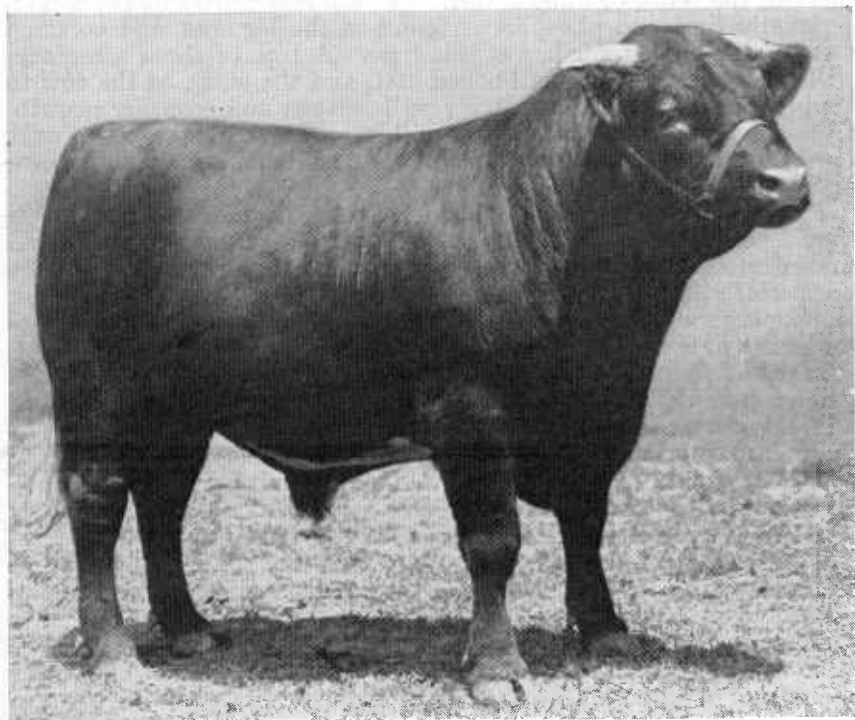


FIGURE 17.—A calf that has been well trained.

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